



let  
your voice  
run your  
errands



Telecom

... a private dial telephone communication system

Telecom is a basic communication system with the convenience and economy of a privately owned dial telephone plus the flexibility of more extensive intercom installations.

Low cost, simple operation and hook-up make it practical for small or large business, industrial use — wherever private voice contact is a requirement.

# Telecom

your private line to efficiency!

Nerve center of the Telecom system is a self-contained, completely automatic switchboard including its own 48-volt power supply. Compact — requires little space. Operation of the system is the same as your city phone... regulation dialing, automatic ring and busy signal. Installs with minimum wiring — single pairs of wires connect each station.

Telecom pays for itself — with increased efficiency from swift voice contact; elimination of wasted steps, interoffice and inter-departmental traffic. And you own Telecom! No fees, no rental — no restrictions as to use or application. With packaged units, standard accessories, it can be adapted, changed or expanded to meet your needs *exactly*.

# Telecom ... your



## Telecom PRIVATE LINE

The Telecom Private Line models are essentially smaller versions of regular single party service in a city telephone system. Each line of a private line switchboard has only one phone plus necessary extensions. Both the phone and all extensions will ring each time this line is called. As in a city system, the calling station dials the desired station and is connected automatically.

To meet expanded needs, certain switchboard models are easily expanded with prewired plug-in assemblies to provide more lines, more links, or both. Each link represents a conversation path. Special applications connect the calling telephone to a paging system, a loud-speaker phone or auxiliary signalling apparatus.

Telecom dial telephone switchboards are housed in dust-tight metal cabinets — feature high quality telephone-type relays, long life stepping switches. Installation is simple and economical. A single pair of wires to each telephone can be fastened to baseboards, molding or framework or run through walls or conduits.

## Telecom PARTY LINE

The Telecom Party Line models are essentially the same as the Private Line models with the exception that each line on the switchboard is arranged for two-party, full selective divided ringing service. They are designed for installations in which a larger than normal number of telephones must be connected to a given size switchboard. Each line on the switchboard may have two telephones plus any necessary extensions for each. Only the desired party phone and the extensions associated with it will ring when its corresponding number is dialed. The second party on the line receives no signal of any kind. Either party may call the other party on the same line. Other features of a party line switchboard are the same as on the private line switchboard.

## Telecom ENGINEERING AND ADVISORY SERVICE

Assistance in planning and installing complex systems or special adaptations is available to architects and engineers . . . to make Telecom fit your exact requirements.

ivate line to efficiency!

## **YOU OWN TELECOM**

It's your own private dial telephone system. Adapt, modify or expand it to your exact requirements. No fees, rentals or restrictions.

---

## **LOW-COST OPERATION**

Low current drain. Even the smallest business or shop can afford Telecom.

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## **SIMPLE INSTALLATION**

A single pair of wires connect each station. Switchboards are compact, take little room.

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## **AUTOMATIC**

Telecom runs by itself 24 hours a day — just like your regular city phone.

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## **VERSATILE**

Can be matched to individual needs. Standard dial systems are available with these extra features . . . paging, code calling (chimes, bells, buzzers) loud ringing service, visual signals, and more.

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## **QUALITY BUILT**

Telecom components meet highest industry standards. Rugged design means dependable, trouble-free service. Voice transmission is crystal-clear

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## **PAYS FOR ITSELF**

Low initial cost, minimum maintenance and low operating costs. Telecom pays for itself in two to five years !

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**it all adds up to better intercommunications**

**TELECOM**  
WEBSTER ELECTRIC

by the manufacturers of TELETALK INTERCOM SYSTEMS

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**ELECTRONICS DIVISION**

**WEBSTER ELECTRIC**



**RACINE · WIS**

## GENERAL SPECIFICATIONS

WEBSTER ELECTRIC  
BULLETIN TC 21-5

**TELECOM**

SP-3 SPEAKER-PHONE AMPLIFIER

SPM SPEAKER-PHONE MASTER



**SP-3**



**SPM-1 & 2**

The Telecom Model SP-3 Speaker-Phone Amplifier and a 45 ohm speaker converts any telephone station into a loudspeaking station. This service is ideally suited for shipping docks, warehouses, laboratories, production lines and similar areas. It also offers definite advantages for the physically handicapped, for workmen who cannot leave their post to answer calls, for conference or other lengthy conversation.

This basic system does not allow call origination. Complete control is maintained at the calling telephone. However, when dial call origination is required, an SPM Speaker-Phone Master is used in place of or in addition to the area speaker. This compact desk speaker also permits selection of hands-free conversation or handset privacy. A switch key provides non-monitoring and extension speaker cut-off.

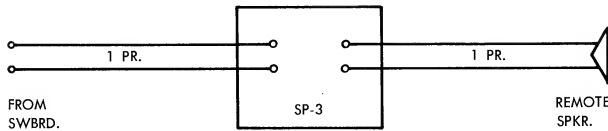
Designed for use with Telecom Automatic Dial Switchboards, the SP-3 Speaker-Phone is suitable for use with any community telephone system by modification of the ring trip circuit.

COMMUNICATIONS DIVISION  
**WEBSTER ELECTRIC**

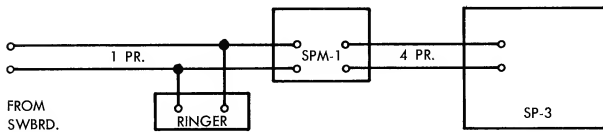


RACINE, WIS.

## systems description



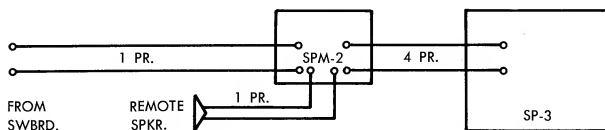
**system 1:** Uses an SP-3 Speaker-Phone Amplifier and one or more 45 ohm remote speakers. The calling party simply dials the SP-3 station from any telephone in the system and may immediately start talking. The called party answers by talking in the general direction of the remote speaker without having to stop work to answer a phone. In large areas or areas where an extremely high noise level exists, the output of the SP-3 is ample to drive more than one high penetration speaker. Calls cannot be originated from the speaker station in this system.



**system 2:** Uses an SP-3 and an SPM-1 Speaker-Phone Master. The SPM-1 is used instead of a remote speaker in situations where the called party is generally stationed near the master but still requires hands-free conversation. Incoming calls are signaled by a buzzer or an external optional ringer. Ringing is stopped and call answered by either using the handset in a conventional manner, or by placing the red plastic hold switch in the UP position and conversing hands-free over the SPM-1 Speaker-Microphone. A volume control on the SPM supplements those on the SP-3 and controls incoming volume. To prevent eavesdropping or gain momentary privacy the white plastic silencing switch can be placed in the UP position, disabling the microphone circuit. At the end of a conversation the equipment is released by hanging up the handset or by returning the hold switch to CENTER position. Each switch has an indicator light which glows when the associated switch is in the UP position.

When two SPM stations are connected in conversation the handset can be used at both stations, however, the speaker-microphone can be used at either, but not both, stations.

Calls are originated from an SPM using the handset or by moving the hold switch to the UP position and using the speaker-microphone. A dial tone will be heard and after dialing a busy or a ringback tone will be received. The call is completed when the called party answers.



**system 3:** Uses an SP-3, an SPM-2 and one or more 45 ohm remote speakers. This system combines the features of Systems 1 and 2. Calls are originated as described for System 1, however, received calls are not announced by a ring signal but by page over either the remote speaker or the SPM-2 Speaker-Microphone as selected by the silencing switch. This switch, as in Sys-

tem 2, cuts off the microphone for privacy in the UP position. In the CENTER position it selects the speaker-microphone and in the DOWN position the remote speaker for call announce and hands-free conversation.

**system installation:** Since all controls may be pre-set and rarely need changing, the SP-3 may be installed where most convenient from a space and wiring standpoint. Remote speakers are installed independently, where they will provide the most satisfactory coverage.

## specifications

### SP-3 SPEAKER-PHONE AMPLIFIER

**signal input:** -29 db (0 db= 1.73 volt/500 ohms) at 1000 cycles.

**power output:** (voice) : 5 watts.

**power supply:** 115 volts AC, 60 cycle.

**power drain:** 60 watts.

**output:** 50 ohms.

**tubes:** Three 12AU7, one 6DJ8, one 7189, one 6CA4.

**size:** 4 $\frac{5}{16}$ " high x 7 $\frac{3}{16}$ " deep x 11 $\frac{3}{4}$ " wide.

**weight:** 10 $\frac{3}{4}$  pounds.

**enclosure:** Metal with birch gray finish.

### SPM-1 SPEAKER-PHONE MASTER

**speaker-microphone:** PM Dynamic type with 1.47 oz. Alnico V magnet. Voice coil impedance 45 ohms.

**handset:** Carbon Mic. Transmitter, Dynamic receiver, Anti-sidetone circuit. Coil cord 5' when extended.

**ringer or buzzer:** Not supplied.

**dial:** Comparable in every respect to community telephone dial mechanism.

**holding switch:** Red plastic two position switch. Connects master station to switchboard for dialing.

**privacy switch:** Transparent plastic two position. Center position normal, UP position disconnects microphone circuit for privacy.

**volume control:** Adjusts incoming sound to suitable listening level.

**indicator lights:** Two, glow when the privacy switch or the holding switch are in the UP position.

**terminals:** Barrier strip type.

**material:** Cabinet and handset molded of high impact Cyclocac, fog grey, non-skid feet.

**weight:** 4 $\frac{1}{2}$  lbs. with handset.

**size:** 7" wide x 7" deep x 6 $\frac{1}{2}$ " high.

### SPM-2 SPEAKER-PHONE MASTER

Same specifications as SPM-1 except:

**privacy switch:** Transparent plastic three position. UP position disconnects microphone circuit for privacy. CENTER position selects speaker microphone for conversation and DOWN position selects remote speaker for conversation.

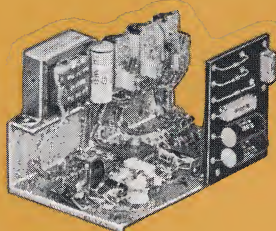
**ringer:** None.

## GENERAL SPECIFICATIONS

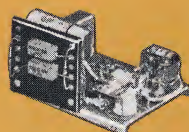
WEBSTER ELECTRIC  
BULLETIN TC 21-6

# TELECOM

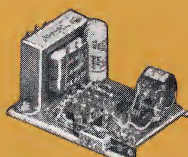
## 1PC10 AND 1PC100 PAGING CONTROL SYSTEMS



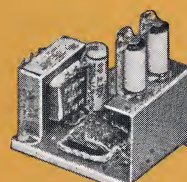
**PCF**



**PCE**



**PCD**

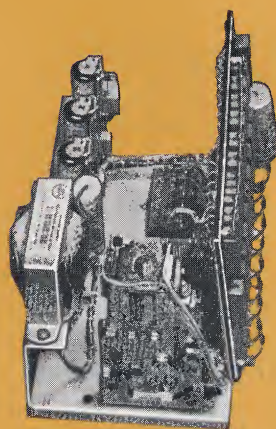
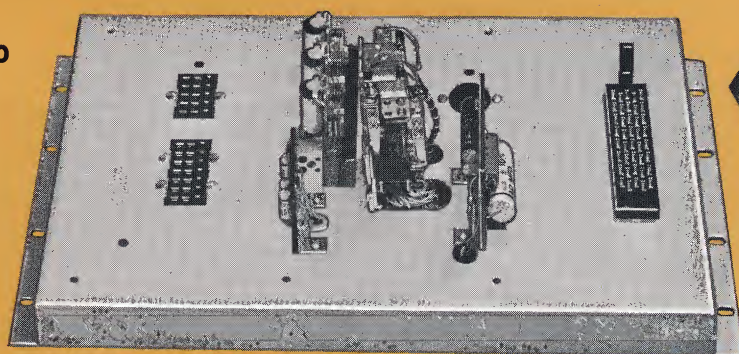


**PCB  
PCH**

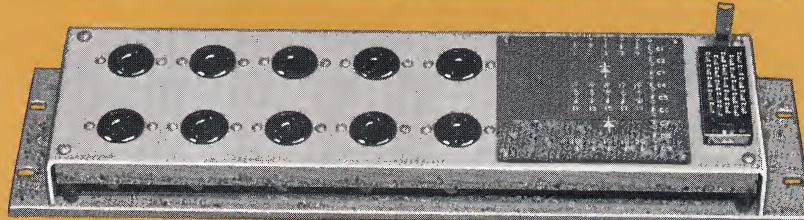


**PCA**

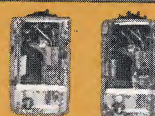
**1PC10**



**PCC**



**PCG**



**PCR-1**



**PCR-2**

The Webster 1PC10 and 1PC100 Area Paging Systems are the most flexible and economical systems available for paging rooms or areas on a selective, group or all-call basis from standard dial type telephones. The modular design simplifies installation and maintenance. Systems may be "tailored" to the specific needs of the user, changed as his needs change without costly field modification.

The 1PC10 System, designed for use in manufacturing plants, marinas and motels, allows a maximum of ten areas to be paged on a selected area or selected area—area group all-call basis. Where a greater number of rooms or areas are to be served, as in dormitories, apartments, schools or hospitals, the 1000 line capacity 1PC-100 System is ideally suited.

Both systems offer a choice of eight types of paging inputs through use of compact plug-in adaptors. Optional equipment such as auxiliary power amplifiers for large area coverage, compressor amplifiers to keep paging at a constant volume level, and speaker phone amplifiers providing hands-free answering at any paging speaker, make these Webster Systems the most versatile systems available.

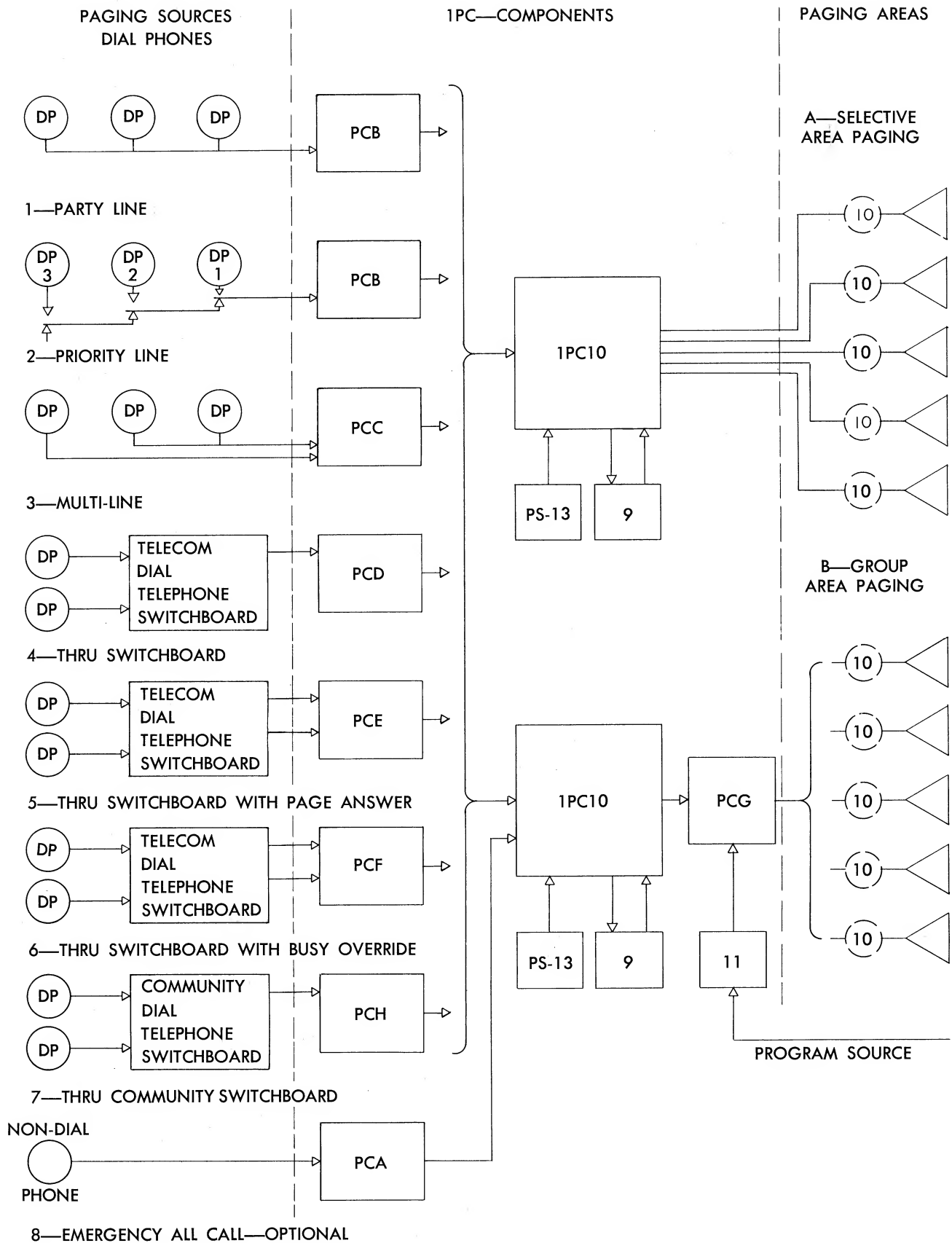
COMMUNICATIONS DIVISION

WEBSTER



ELECTRIC

RACINE, WIS.



## system description

**the 1PC10 switching panel:** This unit is the basic switching component for the Webster Telephone Paging System. All telephone pages are selected by and directed to paging areas through this panel. A flush receptacle receives all eight optional plug-in modules while all voice, dial signal, power, and amplifier lines are connected through one plug-in connector. The Group Relay Panel (PCG) is connected to the basic unit thru a cable plug assembly. Essentially, the 1PC10 operates in the following manner: Dial impulses actuate a relay stepping switch which selects any one of 10 paging area lines. When the dialing is completed, a second switching relay is closed allowing the audio signal to be amplified and pass through the stepping switch directly to the selected area. When used with a PCG group relay panel, the stepping switch closes the relay for the selected area in the PCG panel and the audio signal is directed through the relay switch to the paging area or area group.

**calling sources:** Through use of simple plug-in units, any one of the following seven dial telephone systems, as well as an optional emergency all-call telephone, may be used as paging sources with the 1PC10 paging control panel. Each paging source system is referenced to drawing on opposite page. Note that the phones in Modes 1, 2, 3 and 8 connect directly into the 1PC10 system, while in Modes 4, 5, 6 and 7 operation is through a telecom or other switchboard into the 1PC10 system.

**1. party line:** There is no limitation placed on the number of paging stations (standard dial telephones) used in this system.

The only requirement is not to exceed a 500 ohm loop. This is equivalent to three miles of 22 gage wire. If station loop exceeds three miles larger gage wire may be used. Since all instruments are on a common line, only one paging call may be made at one time. If the system is not in use a dial tone will be heard in the receiver when the handset is removed from the cradle. If the system is in use, the voice of the using party will be heard in the receiver. Only one digit need be dialed to gain access to the desired paging area. This system requires a PCB common line adaptor unit.

**2. priority line:** This system is basically the same as the party line system except that the key phones are interconnected on a priority basis. Typically, phone No. 1 has priority over 2 and 3, phone 2 has priority over phone No. 3, etc. The higher priority phone can take over a paging call area from any lower priority phone by lifting the handset from the cradle. A PCB unit is required.

**3. multi-line:** A PCC line finder adaptor provides a line finder circuit that will accommodate 10 paging lines and assure private operation. Although only one input is provided to the paging equipment, no paging station may intrude on an existing page. Each of the 10 private lines may have extension service if desired, the extension being "party lined" with the original paging station. Both stations will be heard in the paging area if both instruments are off the hook switch. Dialing of only one digit is required to complete the circuit to a paging area. This system is ideal for executive or private use.

**4. thru telecom switchboard:** This mode is identical in function to Mode 3 except that the paging phones are connected first through a Telecom type switchboard and then through a PCD input adaptor into the 1PC10

paging panel. This allows any phone connected to the switchboard to have both internal communication as well as paging capabilities. Access to the paging system is gained by first dialing the number assigned to paging and then dialing (one digit) the paging area desired. A dial tone will be heard after dialing the paging access number, indicating that the paging system is idle and can accept area dialing. If paging system is in use the calling party will receive a busy tone when dialing the switchboard number assigned to the paging system.

**5. through telecom switchboard — with page answering feature:** This system functions identically to system 4, with the addition of a "page answer" feature. This allows any person being paged to use the nearest telephone and, by dialing the "page answer" number, be connected directly to the page originator providing the pager does not hang up. Until both phones are returned to their hook switches the paging system is inoperative. A PCE page answer adaptor is used as an interconnection between the switchboard and the 1PC10 unit.

**6. through telecom switchboard—with priority service:** Similar to Mode 4 in operation, this system incorporates an added executive priority feature which allows selected personnel to have priority over normal paging. If the system is idle, paging from a priority phone may be accomplished in a typical manner by dialing the page access number and then the area number. However, if the system is in use, the priority pager may gain access to the system and automatically disconnect the existing page by dialing a special priority number. On dialing this special number the pager will hear a busy tone from a permanently busied line reserved for priority calls. Then, by pushing a "busy override" button on the priority phone the pager can dial the selected page area. A PCF two line switchboard input adaptor is used with the 1PC10 for this type of service.

**7. through community switchboard:** Again, the function of this mode is identical to Mode 4. However, the PCH Switchboard Selector Level Input Adaptor is used in place of the PCD adaptor, for dry line connection between a community switchboard with selectors or switch through connectors and the 1PC10 control panel. This module in effect bypasses the switchboard, connecting the dial phone directly into the paging system.

**8. emergency all-call:** The emergency all-call, commonly known as the "Red Phone" or "Hot Line", paging feature may be used in conjunction with any of the above seven paging inputs, but only when the type 'B' combined "individual area" and "area grouping" paging system is used. The type 'B' system and components are pictured on opposite page and further described under "Paging Area Systems". By lifting the "Red-Phone" (TEL30-6) from its cradle (dialing is not required) the paging system is automatically thrown into "all-call". This action disconnects all standard services from the paging system, leaving the circuit open for emergency announcements. Any paging station (telephone) in the system may be equipped for emergency priority service by addition of an emergency key and extension of the emergency "hot line" to the telephone.

This feature is normally used by plant security or fire protection personnel. A PCA priority all-call input adaptor is used between the "Red Phone" and the 1PC10 panel.

**paging area systems:** Any one of the seven paging station systems may be circuited thru the 1PC10 paging control panel and distributed to one of two type area paging systems referred to as System 'A' (Selective Area) or 'B' (Area Grouping). Also, as described, the "Hot Line" input can be used in addition to any one of the seven paging station systems when the Type 'B' paging area is used.

**'A' or selective area paging:** In this type system any one of 10 selected areas may be paged thru the 1PC10 panel. Each area can be covered by one or more speakers depending on area size and ambient noise level. If an SP-3 (bulletin TC21-5) Telecom Speaker-Phone Amplifier is switched through the 1PC10 panel, a completely novel service is furnished, in which a page can be answered on a hands-free basis at 20 feet or more from the selected speaker.

**'B' or group areas:** Paging areas may be selected singly or by groups thru use of the PCG Relay Grouping Panel. A total of 10 areas or area groups is the capacity of the system. However the "all-call" feature, whether used or not, utilizes one selection.

An SP-3 amplifier allowing "hands-free" page answering can also be the 'B' output system. Thru use of an audio amplifier (Coded 11 on drawing) any AM-FM or recorded program may be played to all paging areas simultaneously. The program will automatically be disconnected from any area being paged.

## options

**power supply:** Relay power for the 1PC10 panel can be supplied either by a PS-13 power supply or by the power supply of an associated switchboard.

**audio amplifiers:** An audio signal can be routed thru an amplifier of up to 200 watts and the 1PC10 panel without the use of auxiliary relays (Coded 9 on drawing). When more audio power is necessary, the panel provides means for operating control relays for 'B' supply cut-off of additional amplifiers (Coded 10 on drawing). An additional program amplifier (Coded 11 on drawing) is wired between an external program source and the PCG panel.

**speaker-phone amplifier:** The SP-3 amplifier (Bulletin TC21-5) can be used in place of the audio amplifier (Coded 9 on drawing) when hands free answering feature is desired. The output of this unit is 5 watts and is not suggested for use when group areas or areas with high ambient noise levels are being served.

**compressor amplifier:** A Webster WSC515 compressor amplifier (Bulletin TP33-13) may be used in series with the audio amplifier (Coded 9 on drawing) to keep paging at a constant level regardless of the voice level of the pager. The WSC515 may also be used in place of the audio amplifier (Code 9) when area amplifiers are used (Code 10).

## specifications

### 1PC10 SELECTIVE AREA PAGING PANEL

**number of lines:** Single line input from input modules plus emergency all-call input. 10 line output to paging areas or PCG group area panel.

**dialing:** Single digit 0 thru 9.

**dial tone:** 1000 cps special apparatus tone.

**power drain:**  $\frac{3}{4}$  amp. maximum with full complement of plug-in modules.

**talking path:** Two-wire balanced transmission circuit.

**interconnections:** One flush mounted 80-contact receptacle furnished with plug for all input and output wiring; two flush mounted receptacles (15 and 21 contact) for plug-in modules; one 11-prong octal type socket for PCA all-call module.

**components:** One 3-level, 10-line stepping switch, 200 watt capacity; three relays; one diode.

**chassis:** Heavy metal in grey enamel. Rugged metal cover encloses all plug-in modules. Designed for 19" rack and panel mounting; size 19" x 10 $\frac{3}{32}$ " x 7 $\frac{1}{4}$ " deep with cover. Weight 12 $\frac{3}{4}$  lbs.

### PCA PRIORITY ALL-CALL INPUT ADAPTOR:

**connections:** 11-prong flush mounted plug for connection to 1PC10.

**components:** One DC isolation line transformer; 2 relays.

**size:** 3 $\frac{1}{2}$ " x 3 $\frac{3}{4}$ " x 4 $\frac{1}{2}$ ". Weight 1 $\frac{1}{2}$  lbs.

### PCB SINGLE-LINE PHONE INPUT ADAPTOR

**connections:** 15-prong flush mounted plug for connection to 1PC10.

**components:** One DC isolation transformer; two diodes, two relays.

**size:** 3 $\frac{1}{4}$ " x 4 $\frac{3}{4}$ " x 4". Weight 1 $\frac{3}{4}$  lbs.

### PCC MULTI-LINE PHONE INPUT ADAPTOR

**connections:** 36-prong, flush mounted plug for connection to 1PC10.

**components:** One 3-level, 10-line stepping switch; two diodes; three relays.

**size:** 7" x 5 $\frac{1}{2}$ " x 5 $\frac{1}{2}$ ". Weight 4 lbs.

### PCD SINGLE-LINE SWITCHBOARD INPUT ADAPTOR

**connections:** 15-prong flush mounted plug for connection to 1PC10.

**components:** One DC isolation line transformer; one diode; one relay.

**size:** 3 $\frac{1}{4}$ " x 4 $\frac{1}{4}$ " x 2 $\frac{1}{4}$ ". Weight 1 $\frac{1}{2}$  lbs.

### PCE SINGLE-LINE SWITCHBOARD INPUT ADAPTOR WITH PAGE ANSWER SERVICE

**connections:** 15-prong flush mounted plug for connection to 1PC10.

**components:** One DC isolation line transformer; two diodes; two relays.

**size:** 4" x 4 $\frac{3}{4}$ " x 3". Weight 1 $\frac{1}{2}$  lbs.

### PCF TWO-LINE SWITCHBOARD INPUT ADAPTOR WITH PRIORITY SERVICE

**connections:** One 15-prong flush mounted plug for connection to 1PC10.

**components:** One DC isolation line transformer; five diodes; five relays.

**size:** 5 $\frac{1}{2}$ " x 7" x 4 $\frac{1}{4}$ ". Weight 2 $\frac{3}{4}$  lbs.

### PCG PAGE GROUPING PANEL

**number of lines:** 10-line input from 1PC10, plus one for external program source; 9-line output to paging areas.

**connections:** One 50-pin flush receptacle furnished with plug for all input and output connections; nine octal sockets for PGR-1 area relays; one 11-pin octal type socket for PGR-2 all-call relay.

**components:** One diode strapping board for group paging interconnections; ten diodes.

**chassis:** Heavy metal grey enameled base designed for rack and panel mounting.

**size:** 19" x 5 $\frac{1}{4}$ " x 4" deep. Weight 5 lbs. with relays.

### PCH SWITCHBOARD SELECTOR LEVEL INPUT ADAPTOR, SINGLE-LINE

**connections:** 15-prong flush mounted plug for connection to 1PC10.

**components:** One DC isolation line transformer; three diodes, two relays.

**size:** 3 $\frac{1}{4}$ " x 4 $\frac{3}{4}$ " x 4". Weight 1 $\frac{3}{4}$  lbs.

### PGR-1 AREA PAGE GROUPING RELAYS AND PGR-2 ALL-CALL PAGE GROUPING RELAYS

**capacity:** Relay switching will handle up to 200 watts of audio power.

**size:** 1 $\frac{1}{2}$ " sq. x 2" high. Plastic dust covers. Weight 2 oz. each.

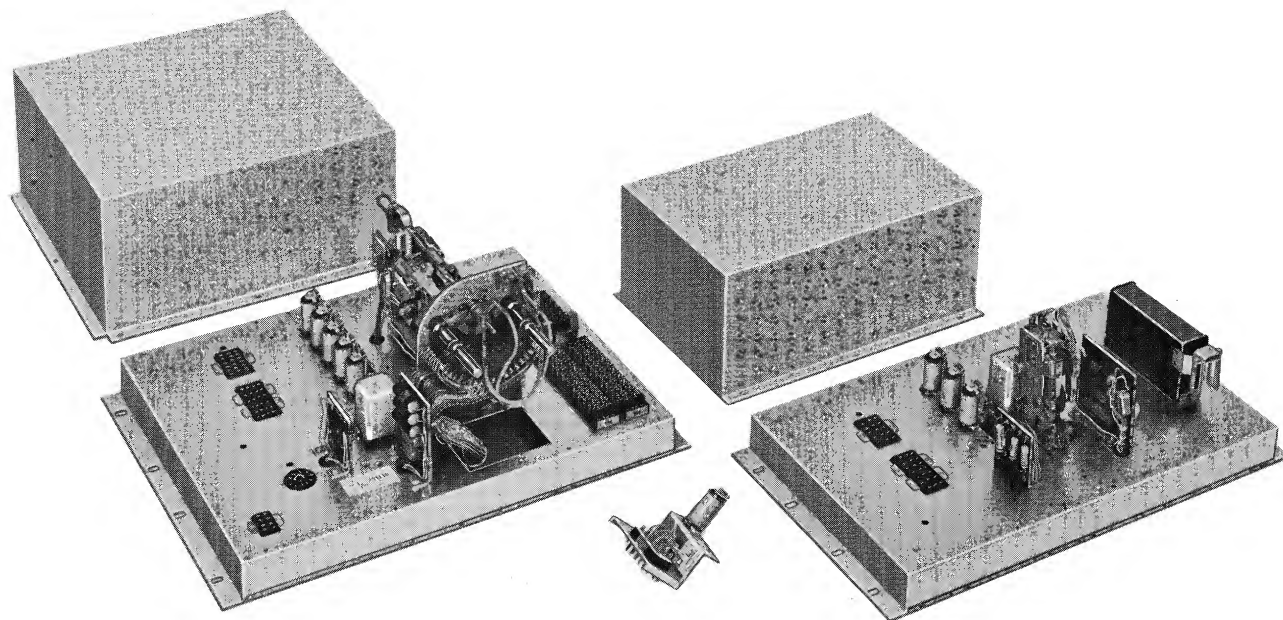
### PS-13 POWER SUPPLY

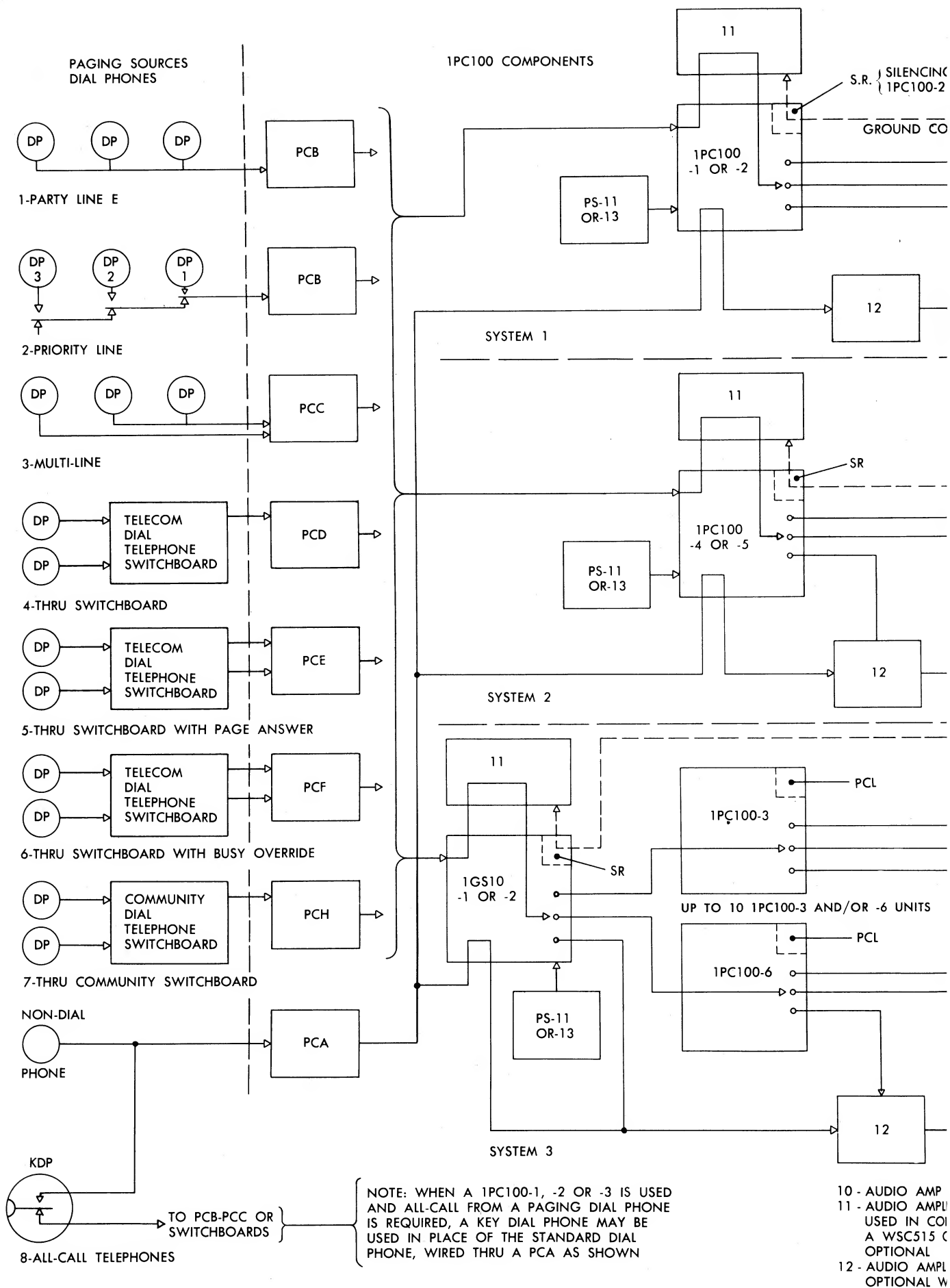
**input:** 115V AC at  $\frac{1}{4}$  amp.

**output:** 48V DC at  $\frac{3}{4}$  amp.

**size:** 7 $\frac{3}{4}$ " x 4 $\frac{1}{2}$ " x 4". Weight 8 lbs.

## 1PC100 PAGING SYSTEM

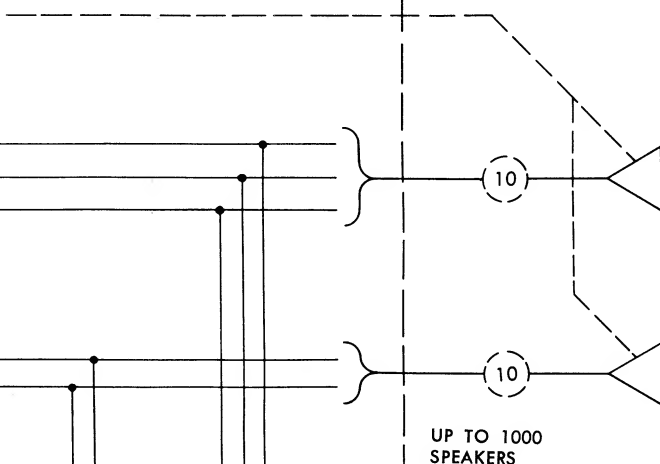
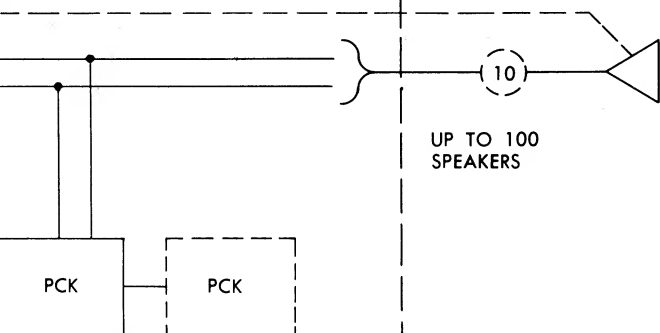
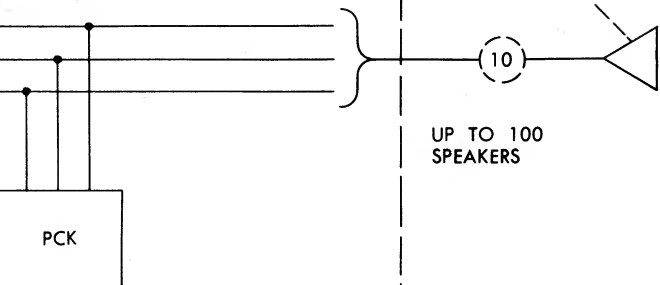




RELAY IN  
& -4 & 1GS10-2

CONTROL LINE

PAGING  
AREAS  
OR ROOMS



AUX OPT)  
FIER OR SP3  
JUNCTION WITH  
COMPRESSOR AMP  
FIER USED WITH AN  
SC515

## 1PC100 SYSTEM DESCRIPTION

**general:** The diagram on the opposite page indicates 3 basic systems. System 1, making use of a 1PC100-1, allows paging through a maximum of 100 speakers to as many rooms or areas. Through use of an optional non-dial phone, an auxiliary power amplifier and a PCA and PCK adaptor, all rooms can be interconnected for all-call paging. All-call may also be originated from any dial phone in the system by substituting a key type dial phone for the standard phone, connected through the PCA adaptor as shown. The 1PC100-2 functions the same as the -1 but includes a silencing relay which can be controlled from a switch located on any paging speaker. This relay will disable the return conversation path of a speaker phone amplifier, when used, thus assuring privacy at the paging speaker.

Paging is accomplished by first dialing the page access number assigned to the 1PC100 unit and then a 2-digit speaker number.

System 2 makes use of a 1PC100-4 or -5. The capacity and function of this system is the same as System 1, however a 3rd wire per line provides a control lead for annunciator canceling or, as shown, may be used to dial all-call through any one line to all other speaker stations. In this system the optional all call phone can be used, however substitution of a key dial phone for all-call from a standard paging source is unnecessary. The -5 differs from the -4 in that it includes a silencing relay as described in System 1.

Paging is accomplished in the same way as described for System 1.

Where more than 100 speakers are to be served a maximum of ten 1PC100-3 and/or -6 units, each capable of handling 100 speakers, can be connected as shown in System 3. This system requires a 1GS10-1 or -2 group switching panel. The 1GS10-2 includes a silencing relay which operates as in System 1. The 1PC100-3 functions like a 1PC100-1 and the -6 like a -4 except both units incorporate a PCL input module which forwards dial pulses from the 1GS10 unit into the 1PC100-3 and -6 stepping switches. As shown, various combinations of all-call can be utilized in this system. Total all-call can be originated from a key dial phone and/or optional phone as in System 1, or can be dialed directly through one line of a 1PC100-6 or the 1GS10. Further, group all-call can be incorporated in this type system by reserving one line of a 1PC100-6 for each selected group. A separate PCK all-call relay panel must be used for each group of 100 or less speakers.

Paging is accomplished by first dialing the page access number assigned to the 1GS10, then dialing a 3-digit number the first of which selects the 1PC100 unit and the last two the speaker.

**calling sources:** Any one of seven dial telephone systems as well as an optional all-call phone may be used as paging sources. These systems are connected and used as described for the 1PC10 system in the first section of this brochure. Note that, as previously mentioned, a key dial phone must be used in place of a standard dial phone in certain cases.

## options

**power supply:** Relay power for the 1PC100 systems can be supplied either by a PS-11 power supply or by the power supply of an associated switchboard.

**audio amplifiers:** An audio signal can be routed thru an amplifier of up to 200 watts and the 1PC100 panels and PCK relays without the use of auxiliary relays (Coded 11 and 12 on drawing). In areas or rooms having a high ambient noise level remote amplifiers may be used for additional audio power. (Coded 10 on drawing).

**speaker-phone amplifier:** The SP-3 amplifier (Bulletin TC21-5) can be used in place of the audio amplifier (Coded 11 on drawing) when the optional page answering feature is desired. The output of this unit is 5 watts and is not suggested for use when areas or rooms with high ambient noise levels are being served.

**compressor amplifier:** A Webster WSC515 compressor amplifier (Bulletin TP33-13) may be used in series with the audio amplifier (Coded 11 and 12 on drawing) to keep paging at a constant level regardless of the voice level of the pager.

**telephones:** Tel 24-1 Desk Type or Tel 25-1 Wall Type twist key phones may be used when an optional all-call phone is required (paging source 8 on drawing). A Tel 30-6 non-dial red phone may also be used for emergency all-call (See Telephone Specification Bulletin TC21-4).

## specifications

### 1PC100-1 PAGING CONTROL SWITCHBOARD

**number of lines:** 100 output lines to reach all areas or rooms.

**talking path:** 2 wire balanced transmission circuit.

**dial tone:** Operates when handset is lifted from cradle indicating system ready for dialing.

**dialing:** Two digits 11 thru 00 to reach any of 100 areas.

**power requirement:** 1½ amp for a complete 1PC100 system with full complement of plug-in modules.

## components

**interconnections:** One 15 point and one 21 point Jones socket for plug-in connection of all inputs and PCL plug-in modules.

One 11 pin octal socket for PCA plug-in module.

One 8 pin octal socket for plug-in of SR silencing relay.

Two 100 point Jones type H sockets for output connections. Jones plug supplied.

One 50 point Jones type H socket for all input connections such as phones, power, control lines, paging amplifiers, etc. Plug supplied.

**switches:** One Strowger type two motion stepping switch to switch 100 pair.

**misc. components:** 5 relays, 2 selenium rectifiers, 1 diode.

**cabinet:** Heavy metal, 19" wide x 14" high x 12" deep with metal dust cover.

Designed for 19" rack mounting (screws supplied). Finished in Webster Birch Grey semi-gloss baked enamel. Weight 50 lbs.

1PC100-2 Same as -1 but includes SR silencing relay to control direction of SP3 Speaker phone or conventional voice amplifier.

1PC100-3 Same as -1 but wired for use with a 1GS10 Group Selection Panel.

1PC100-4 Same as -1 except stepping switch includes an additional 100 contacts for control line plus a 100 point Jones socket for connections (plug included).

1PC100-5 Same as -4 but includes SR silencing relay.

1PC100-6 Same as -4 but wired for use with a 1GS10 Group Selection Panel.

### 1GS10-1 GROUP SELECTION SWITCHBOARD

**number of lines:** 10 output lines to ten 1PC100-3 or -6 Paging Control Switchboards.

**talking path:** 2 wire balanced transmission circuit.

**dial tone:** Operates when handset is lifted from cradle indicating system ready for dialing.

**dialing:** Three digits—111 thru 000 to reach any of 1000 areas.

## components

**interconnections:** One 15 point and one 21 point Jones socket for plug-in connection of input modules.

One eleven pin octal socket for PCA plug-in module; one eight pin octal socket for plug-in of SR silencing Relay; one 80 point Jones type H socket for all output connections to 1PC100 units and other connections such as phones, power, control lines, paging amplifiers, etc. Plug included.

**switch:** One C.P. Clare Type 11 three level stepping switch to switch ten voice pair and ten control lines.

**misc. components:** 3 relays, -2 selenium rectifiers, one diode.

**cabinet:** Heavy metal, 19" wide x 10½" high x 7¼" deep with metal dust cover. Designed for 19" rack mounting (screws supplied). Finished in Webster Birch Grey semi-gloss baked enamel. Weight 13 lbs.

1GS10-2 Same as -1 but includes SR Silencing Relay to control direction of SP3 Speaker phone or conventional voice amplifier.

**PCK:** All call relay panel.

**number of lines:** 100 output line pairs, connected to output lines of 1PC100 units or direct to remote speakers.

## components

**interconnections:** Two 100 point type H Jones sockets and plugs for connection of voice lines. One 8 pin octal socket for plug-in all-call control relay; one 8 pin octal socket and plug for connection from power amplifier, control signal and power supply.

**switches:** 4 grouping relays each handling 25 voice pairs. One all-call relay.

**cabinet:** Heavy metal, 19" wide x 5¼" high x 6" deep with metal dust cover. Designed for 19" rack mounting (screws supplied). Finished in Webster Birch Grey semi-gloss baked enamel. Weight 5 lbs.

PCL—Input plug-in relay module for 1PC100-3 and -4 units when used with a 1GS10. Acts to forward dial pulses from 1GS10 to stepping switch of 1PC100.

### PS-11 POWER SUPPLY

**input:** Transformer tapped for 109, 113, 117, 121 or 125V A.C. 60 cy. Fused at 2 amp.

**output:** 115V A.C. and 12, 48 and 60V D.C. Fused 2.0 amp. at 48V and .25 amp. at 12, 60 and 115V.

**output power:** 155 watts at full load.

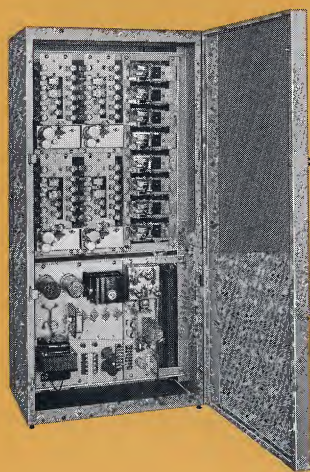
**housing:** Metal case 9¼" x 18" x 6¼" deep, pre-drilled holes for wall mounting and knockouts for electrical connections. Weight 34 lbs.

## GENERAL SPECIFICATIONS

# WEBSTER ELECTRIC BULLETIN TC 21-2 **TELECOM** LS SERIES LOUD SPEAKING INTERCOM



**LSM-1**  
without handset



**4LS23**  
switchboard



**LSM-2**  
with handset

Here is an entirely new kind of intercommunication system . . . compact, convenient, suprisingly inexpensive to install and maintain.

The LS series Telecom is the first system of its kind. It combines the flexibility and hand-free operation of loud-speaking intercommunication with the privacy and economy of automatic dial telephone intercommunication.

Heart of this new Telecom system is the 4LS23 fully automatic switchboard. Comparable in design and con-

struction to community telephone switchboards, the 4LS23 provides four links (conversation paths), permitting four simultaneous conversations, and twenty three lines. Each line accomodates one master station and, if desired, one or more extension stations.

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RACINE, WIS.

## features

Individual plug-in transistor amplifiers on each link, for uninterrupted service.

Diode circuitry, for fewer moving parts and fewer service problems.

Standard American-made parts used throughout to assure availability.

Dialing and switching circuits separate from talking circuit, for noise and click suppression.

Standard dial tone and busy tone, plus a buzz tone when called station is being signalled.

Automatic by-pass of inoperative or busy links, to assure fast, uninterrupted service.

Single central power supply unit in switchboard cabinet to provide power for entire system. Switchboard may be installed in any convenient location.

LSM master stations are smart and completely functional in styling, require no more space than an ordinary desk telephone and are equipped with non-skid feet. The dial is rugged and mounted at the correct angle for easy operation. The volume control adjusts incoming signals to the desired "listening level", does not affect outgoing signals.

The sensitive speaker-microphone gives excellent voice transmission.

Installation is simple, since these master stations do not require an AC connection or large multi conductor cable. A standard two pair twisted cable connects master stations to the switchboard. One twisted pair for voice leads and a twisted pair for control leads and ground.

## specifications

### 4LS23 SWITCHBOARD

**number of links (conversation paths):** 4, giving 17% linkage. Exceeds linkage provided on standard community telephones.

**number of lines:** 23 private lines.

**number of stations:** 23, plus extensions.

**dialing:** 1, 2, or 3 digits to reach all stations. 1-9, 01-09, 001-005.

**regulated power supply:** 109 to 125 volts AC, 60 cycle, input provides a nominal 48 volt DC at two amps output for switching and a constant 35 volt DC at one amp output for the transistor amplifiers.

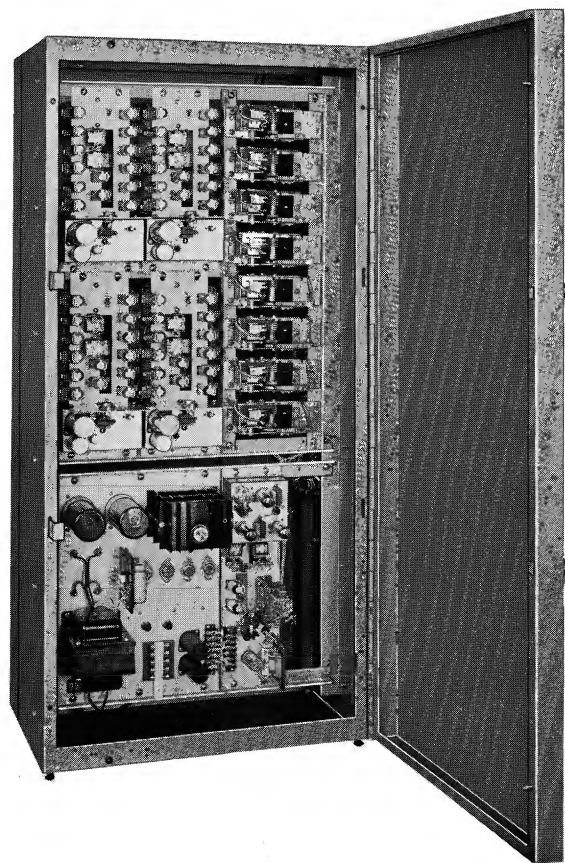
**power drain:** 75 watts when idle, 200 watts at full load.

**circuit protection:** Both AC and DC circuits protected by suitable fuses.

**talking path:** Two-wire balanced transmission circuit, with a transistorized voice amplifier, gives crisp, clear, noise-free conversation. Amplifier output 1 watt. Frequency response, special slope for maximum fidelity (clarity) of voice transmission.

**line resistance:** 100 ohms maximum loop (approximately 3000 feet of No. 22 twisted pair wire, run from any master to switchboard.)

**dial tone:** Indicates line is available for dialing.



**buzzer tone:** A one second duration tone. Signals called and calling station that a call has been placed.

**busy tone:** Indicates that the called station is busy.

**line circuits:** Solid state; no moving parts. Diode circuitry replaces line and line cut-off relays for trouble free operation.

**link distributor:** Rotary; routes calls to unbusy links in rotation, assuring even usage of all links. Its "time-out" feature automatically steps to another link if inoperative link or line is encountered.

**cabinet:** Heavy, dust-tight metal in gray hammer-tone enamel. Front and rear access doors equipped with full-length piano type hinges and locking handles. Equipment is accessible from both sides even when cabinet is wall mounted.

**size:** 45 $\frac{1}{16}$ " high x 20 $\frac{5}{8}$ " wide x 17 $\frac{1}{4}$ " deep.

**weight:** Approximately 285 pounds.

**4LS50 SERIES SWITCHBOARD** (Contact Webster Electric Sales Division for delivery and price schedule.)

**number of links (conversation paths):** 4, expandable to 8, giving 8 to 16 per cent linkage.

**number of lines:** 50 private lines.

**number of stations:** 50, plus extensions.

**dialing:** Two digits to reach all parties. 21-25, 31-35, 41-40, 51-50, 61-60, 71-70.

**regulated power supply:** 109 to 125 volts AC, 60 cycle, input provides a nominal 48 volt DC at 4 amps output for switching and a constant 35 volt DC at 2 amp output for the transistor amplifiers.

**power drain:** 100 watts when idle, 300 watts at full load.

**circuit protection:** Both AC and DC circuits protected by suitable fuses.

**talking path:** Two-wire balanced transmission circuit, with a transistorized voice amplifier, gives crisp, clear, noise-free conversation. Amplifier output 1 watt. Frequency response, special slope for maximum fidelity (clarity) of voice transmission.

**line resistance:** 100 ohms maximum loop (approximately 3000 feet of No. 22 twisted pair wire, run from any master to switchboard.)

**dial tone:** Indicates line is available for dialing.

**buzzer tone:** A one second duration tone. Signals called and calling station that a call has been placed.

**busy tone:** Indicates that the called station is busy.

**line circuits:** Solid state; no moving parts. Diode circuitry replaces line and line cut-off relays for trouble free operation.

**link distributor:** Rotary; routes calls to unbusy links in rotation, assuring even usage of all links. Its "time-out" feature automatically steps to another link if in-operative link or line is encountered.

**cabinet:** Heavy, dust-tight metal in gray hammer-tone enamel. Front and rear access doors equipped with full-length piano type hinges and locking handles. Equipment is accessible from both sides even when cabinet is wall mounted.

**size:** 64 $\frac{5}{16}$ " high x 20 $\frac{5}{8}$ " wide x 17 $\frac{1}{4}$ " deep.

**weight:** Approximately 385 pounds.

## LSM-1 MASTER STATIONS

**dial:** Comparable in every respect to community telephone dial mechanism.

**line holding switch:** Red plastic two-position switch. Connects master station to switchboard so a call may be placed.

**talk-listen switch:** Transparent plastic three-position switch; down to talk spring loaded to normal or center to listen, and up for idle or dictate position. Called party may operate the Talk-Listen switch in idle (up) position for hands-free operation.

**volume control:** Adjusts incoming sound to suitable listening level.

**hold light:** Indicates that lineholding switch is ON.

**monitor light:** Indicates an incoming call when the Talk-Listen switch has been left in the idle position for hands-free operation.

**speaker-microphone:** PM dynamic type with 1.47 oz. Alnico V magnet. Voice coil impedance 45 ohms.

**cabinet:** Molded high impact Cycolac; non-skid feet; fog gray.

**size:** 7" wide x 6 $\frac{1}{2}$ " high x 7" deep.

**weight:** 3 lbs. without handset; 4 lbs. with handset.

## optional models

**LSM-2:** Same as LSM-1, but with handset and cradle. Handset is equipped with a press-to-talk switch which takes over the functions of the Talk-Listen switch when the handset is used. Hookswitch takes place of Line Holding switch and transfers voice from speaker to handset.

**LSM-3:** Same as LSM-1 except that dial and line holding switch are omitted; for receiving calls only.

**LSM-4:** Same as LSM-3, but with handset.

**LSM-5:** Same as LSM-3, except that Talk-Listen switch is also omitted; unit operates in idle position at all times.

## optional equipment

**paging:** One or more Webster 85B-25 amplifiers, in combination with a paging speaker or speakers may be used on any line in place of a regular LSM station, for paging in large or noisy areas.

## architect's specifications

A Loudspeaking Intercommunication System shall consist of:

- ☐ A 4LS23 switchboard with 4 links giving 17% linkage over 23 private lines plus extensions. Dialing shall require 1, 2 or 3 digit numbers to reach all stations. When placing a call a distinctive tone shall indicate that a line is available for dialing, a buzzer tone will signal both the called and calling station that the call has been placed, while a third type tone shall indicate that the called station is busy.

The unit shall incorporate a two-wire balanced transmission circuit with a transistorized voice amplifier of 1 watt output, affording maximum fidelity of voice transmission and noise free conversation.

The power supply shall be built in and be designed to operate from a 109 to 125 volt AC, 60 cycle line. It shall provide a constant output of 48 volts DC at 2 amps. for switching and 35 volts DC at 1 amp. for the transistorized amplifier. Both AC and DC circuits shall be protected by suitable fuses. Total power drain shall not exceed 75 watts when idle or 200 watts at full load.

Line circuits shall be of the solid state type with diodes used in place of line and line cut-off relays, while a rotary link distributor shall be used to route calls through a non-busy link.

The complete unit shall be housed in a rugged, dust-tight cabinet providing both front and rear access doors equipped with full length piano type hinges and locking handles. The cabinet shall be so designed as to allow access to equipment from both sides even when cabinet is wall mounted.

- ☐ A 4LS50 Switchboard with ..... (4 to 8) links giving .....% linkage over 50 private lines plus extensions. (For complete specifications contact the Webster Electric Sales Division.)

The system shall also consist of the following stations:

- ☐ LSM-1 Master Stations designed to be operated hands-free at a called station. Each unit shall incorporate a P.M. dynamic type speaker microphone of 45 ohm impedance and a dial comparable to a community telephone dial mechanism. A two position red plastic line holding switch will be used to connect the station to the switchboard when placing a call and a hold light will indicate that the switch is ON. A transparent plastic three position Talk-Listen switch will operate as follows:

CENTER position for listening and receiving calls, DOWN to talk and UP to dictate or for hands-free conversation at a called station. A monitor light will indicate an incoming call when the Talk-Listen switch has been left in the UP position. A volume control will adjust incoming sound to a suitable listening level. The case shall be molded of high impact Cyclocac and set on non-skid rubber feet.

- ☐ LSM-2 Master Stations having the same specifications as the LSM-1 with the addition of a cradle and handset equipped with a Press to Talk switch which will take over the functions of the Talk-Listen switch when the handset is used. A hookswitch will replace the line holding switch and transfer voice from speaker to handset.
- ☐ LSM-3 Stations for receiving calls only over speaker-microphone. (These units shall meet the same specifications as the LSM-1 Master Stations except the dial and the line holding switch are omitted.)
- ☐ LSM-4 Stations for receiving call only over Speaker-microphone or handset.  
(These units shall meet the same specifications as the LSM-3 Stations with the addition of handset and cradle.)
- ☐ LSM-5 Stations for receiving calls only over speaker-microphone or handset. The units will operate in idle position at all times. (These units shall meet the same specifications as the LSM-3 stations except the Talk-Listen switch is omitted.)

In addition the system shall include the following amplifiers and area paging speakers:

- ☐ 85B-25 Paging Amplifiers (For specifications refer to Bulletin TT93-2.)
- ☐ WSS250 Speakers (Refer to Bulletin TP37-8 for specifications.)
- ☐ WSS201 Speakers (Refer to Bulletin TP37-1 for specifications.)
- ☐ WSS206 Speakers (Refer to Bulletin TP37-3 for specifications.)
- ☐ WSS205 Speakers (Refer to Bulletin TP37-2 for specifications.)
- ☐ WSS213 Re-entrant horn (Refer to Bulletin TP37-5 for specifications.)
- ☐ WSS210 Re-entrant weatherproof trumpet (Refer to Bulletin TP37-4 for specifications.)

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**T**  
**elecom**<sup>®</sup>

brings phone bills **DOWN**

brings efficiency **UP**



# WEBSTER ELECTRIC HOW Telecom® CUTS THE COST OF



Maximum use of employee time, controlling "controllable costs" are important factors in today's economy. And sometimes it's the "little things" that count up fastest.

Take your telephone bill. When employees have easy access to outside lines, social calls often boost phone bills higher than you might think. On many systems, internal calls account for 75% of total traffic.

A Telecom system is automatically restrictive. It handles only internal calls. It discourages "telephone socializing" by replacing outside phones except where they are required for outside contacts.

Since fewer outside phones are required, monthly phone charges drop accordingly (often drastically). A Telecom private switchboard will actually pay for itself in telephone bill savings. You save the cost of intercom buttons. You reduce long distance toll charges. And, equally important you gain the efficiency of convenient voice contact throughout your organization without tying up your outside telephones.

When a customer calls for information you can get it for him while he is on the line. No need to call back; no need to leave the customer dangling on a hold button. You eliminate the chance that your customer will get cut off or lost in the telephone shuffle.

You will be amazed at the way a Telecom private switchboard cuts time-wasting interoffice traffic . . . increases the efficiency of your whole organization. Its fast two-way voice contact can be an important factor in controlling "controllable costs" and reducing office overhead.

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## Telecom®

is economical,  
versatile,  
adaptable

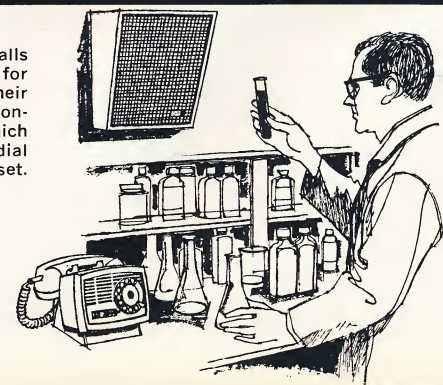


**OWN OR LEASE TELECOM** — You can pay for it once and have unlimited use of the system from then on, or lease it for a modest monthly rate if you prefer. No extra charges, no tax. Low cost wiring, simple installation and economical expansion keep your costs low right from the start.

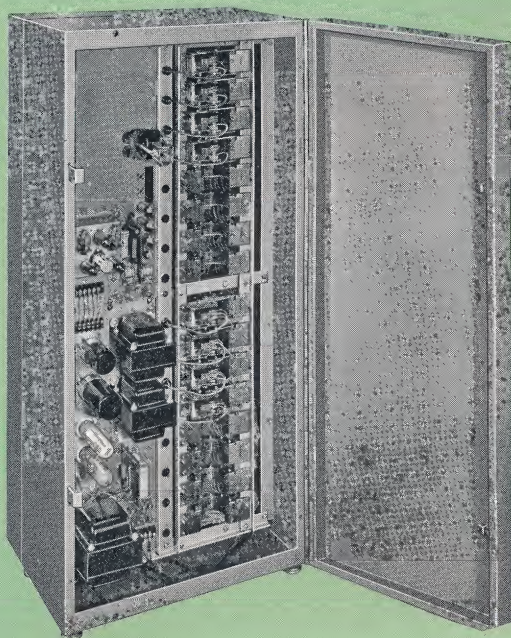
**TELECOM IS ADAPTABLE** for any location . . . ideal for widely scattered locations; carries over 11½ miles. Telecom is available with paging, code call, dictation service, conference circuit. Desk and wall phones in beige, green, gray and black.



**SPEAKER-PHONE AMPLIFIER** permits calls to be answered hands-free — ideal for locations where people cannot leave their job to answer the phone in the conventional way. A desk unit is also available which can be used to originate calls with a dial and answer hands-free or with a handset.



# DOING BUSINESS!



## Completely automatic switchboard — the “brains” of a Telecom system

This is probably the only time you'll ever see the inside of a Telecom switchboard. Or need to. Latest engineering advancements give your Telecom system exceptional performance and dependability. Constructed to the same high standards as your utility phone equipment, it's practically maintenance-free.

Telecom switchboards are compact, may be installed in out-of-the-way locations. They serve from 2 up to 1000 phones and provide all of the familiar features you're accustomed to on your regular phone . . . automatic dialing convenience, busy signal, dial tone, automatic ring . . . plus important extras.

### Chart your savings with the Telecom system that fits your business

System Model	Phones		Simultaneous Conversations	Dial Digits	Exec. Busy Override	ACCESSORY FEATURES				
	Private	Party				Auto. Code Call	Dictation Adaptor	Confer. Circuits	Area Paging	Hands-Free Speaker Phone
1 B 10	10	—	1	1	X				X	X
2 DA 16	16	—	2	1 or 2	X	X	X		X	X
4 DA 28	28	—	4	1, 2 or 3	X	X	X	X	X	X
4 DA 50	50	100	4, Expand to 8	2 or 3	X	X	X	X	X	X
5 D 92	92	184	5, Expand to 8	2, 3 or 4	X	X	X	X	X	X
6 DA 100	100	200	6, Expand to 12	2 or 3	X	X	X	X	X	X
12 DA 200	200	400	12, Expand to 24	3 or 4	X	X	X	X	X	X
30 DA 500	500	1000	30, Expand to 60	3 or 4	X	X	X	X	X	X

#### COMMUNICATIONS DIVISION

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*In Canada: Webster Electric (Canada), Ltd., Kitchener, Ontario*

**how  
much  
are  
push-  
buttons**



**costing you?...**

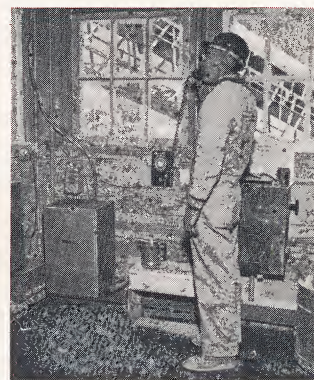
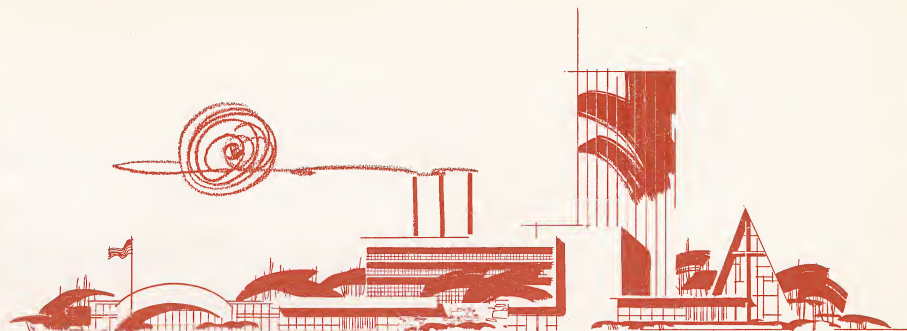


# There's nothing more convincing than a demonstration!

... and we can prove it in your office, in your plant or at one of our recent Telecom installations. We can show you how Telecom can be tailored to your exact requirements — how it can save you steps and time, cut your phone bill, *pay for itself!*

Most important, we provide complete service. As sound engineers *specializing in communications*, we're completely qualified to work with you in initial planning, installation, and in the expert servicing and maintenance of your Telecom system.

May we demonstrate Telecom? There's no obligation, of course. Just give us a call!



Telecom fits well into your business—meets specific management needs. It's styled to be at home in customer service areas (top left)—it's designed to stand up in rugged areas (top right). Small offices . . . large offices . . . remote stations . . . Whatever your requirements, Telecom serves you better.

# TELECOM

## THE COMPLETE DIAL INTERCOMMUNICATION SYSTEM

Telecom *versatility* can help make intercommunications serve you better — in more ways ! In addition to providing the basic function of fast, private voice contact between your key people and departments, Telecom can be readily adapted for paging, code call (chimes, buzzers, bells), speaker phones, dictation service, conference circuit. And it is specially suitable for widely scattered stations — carries over 11½ miles !

Telecom systems are available with 2 or up to 400 phones—and its own self-contained, completely automatic switchboard. You get many of the familiar features you're accustomed to on your regular utility phone. There's automatic dialing convenience, dial tone, busy signal, automatic ring, simple operation. Initial cost is low, maintenance is low — and because it installs with minimum wiring, your Telecom system can be expanded or modified both simply and economically.

Telecom versatility gives you the option of planning a *custom* installation around *standard* units. Phones are available in 12 decorator colors, extra stations can be added as needed (expansion is planned in!), special features are readily integrated.

With your own *private* Telecom system you free your switchboard of inside calls, fewer outside telephones and costly extra features are needed . . . your phone bills are lower. More, Telecom makes your key personnel *instantly* available, with the resulting increase in efficiency.



## LATEST ENGINEERING ADVANCEMENTS GIVE TELECOM EXCEPTIONAL PERFORMANCE AND DEPENDABILITY

**Nerve Center** of the Telecom intercommunication system is the automatic switchboard, American made by Webster Electric Co., whose engineers have equipped it with newest electronic features to assure fast, uninterrupted service.

- 1. Diode Line Circuits** — now replace about 50% of the relays. New circuits have no moving parts, are impervious to dirt and dust, and eliminate up to 65% of potential service problems.
- 2. Rotary Link Distributor** — the "brain" of the switchboard. It automatically keeps switchboard from jamming by distributing or routing calls to unbusy links. If for any reason a link cannot handle a call a special "time out" relay will automatically free the link.
- 3. Link (Conversation Paths) Protection** — assures uninterrupted operation. In the event of malfunction, each link is protected with a separate fuse which automatically "busys out" and "refers" the call to the next unbusy link. Full service is easily restored at next maintenance check.
- 4. Executive Override** — optional feature that permits any phone equipped with Executive Override button to break in on any busy station.
- 5. Balanced Transmission** — prevents annoying crosstalk, hum and voice pick up from electrical service.
- 6. 500 Ohm Loop** — for longer range carrying power; over 11½ miles! Crisp, clear conversations carry the following maximum distances:  
22 ga. wire, 15,000 ft.; 20 ga. wire, 24,000 ft.; 19 ga. wire, 30,000 ft.; 16 ga. wire, 61,000 ft.

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